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10/767,385	01/28/2004	John W. Worthington	07844-628001	4750

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EXAMINER	
ABDI, AMARA	
ART UNIT	PAPER NUMBER
2609	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/19/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/767,385	WORTHINGTON, JOHN W.	
	Examiner	Art Unit	
	Amara Abdi	2609	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-7,9-22,24-26 and 28-38* is/are rejected.

7)☒ Claim(s) *4,8,23 and 27* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *01/28/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The specification is objected to because of the following formalities:

(1) On page 1, line 14, the examiner suggest inserting "," between "**of**" and "**or**"

(2) On page 2, line 3, the examiner suggest inserting "," between "**at**" and "**or**"

Appropriate correction is required.

Claim Objections

2. Claims 1-18,25-27, and 35-38 are objected to because of the following informalities:

(1) Claim 1, line 7, "**a** neighborhood" should be changed o "**the** neighborhood", the same informality was found in line 5, of **claim 37**

(2) Claim 4, line 2, "**the** value" should be changed to "**a** value", the same informality was found in line 2, of **claim 23**

(3) Claim 8, line 2, "**a** forward" should be changed to "**the** forward", the same informality was found in line 2, of **claim 16**

(4) Claim 18, line 7, "**a** convolution' should be changed to "**the** convolution", the same informality was found in line 8, of **claim 37**

(5) Claim 25, line 4, "**a** substantially" should be changed to "**the** substantially"

(6) Claim 35, line 3, "**a** forward" should be changed to "**the** forward"

(7) Claim 37, line 10, "**a** pixel" should be changed to "**the** pixel"

(8) Claim 38, line 11, "**a** depth" should be changed to "**the** depth"

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

4. Claims 1-3,5-7,11-14,18,20-22,24-26,30-33, and 37 are rejected under 35 U.S.C. 102(e) as being anticipated by Kaufman et al. (USPGPUB 2003/0095693)

(1) Regarding claim 1 and 20:

As shown in figure 7, steps 126 and 128, Kaufman et al. disclose a method and software product (figure 3, paragraph [0023], line 5-7) for filtering an image including a plurality of pixels (paragraph [0013], line 5-9), the method comprising:

receiving a forward kemel centered at a first pixel in the image, the forward kernel assigning forward weights to pixels in a neighborhood surrounding the first pixel (paragraph [0116], line 7-9);

specifying a backward kernel centered at a second pixel within the neighborhood surrounding the first pixel based on a local attribute of the image at the second pixel, the backward kemel assigning backward weights to pixels in a neighborhood surrounding the second pixel (paragraph [0120], line 1-7), (the examiner interpreted the back projection reconstruction as the backward kernel)

determining a convolution weight of the second pixel based on the backward kemel and the forward kernel (paragraph [0109], line 1-14), (the examiner interpreted

the forward kernel as Fourier transform, and backward kernel as inverse Fourier transform)

using the convolution weight and a pixel value of the second pixel to generate a new value of the first pixel (paragraph [0108], line 7), (the examiner interpreted that the convolution kernel formula recited in paragraph [0108], line 7 can be used to generate a new value of the first pixel).

(2) Regarding claim 2 and 21:

Kaufman et al. disclose a method and software product (figure 3, paragraph [0023], line 5-7), where determining the convolution weight of the second pixel includes:
Determining a forward weight assigned to the second pixel by the forward kernel (paragraph [0116], line 7-9);
Determining a backward weight assigned to the first pixel by the backward kernel (paragraph [0120], line 1-7); and
Using the forward weight and the backward weight to determine the convolution weight of the second pixel (paragraph [0109], line 1-14).

(3) Regarding claim 3 and 22:

Kaufman et al. disclose the method and software product (figure 3, paragraph [0023], line 5-7), where the determining of the convolution weight of the second pixel includes multiplying the forward weight and the backward weight (paragraph [0109], line 1-4)

(5) Regarding claim 5 and 24:

Kaufman et al. disclose the method and software product (figure 3, paragraph [0023], line 5-7), where the determining of the convolution weight of the second pixel includes specifying a substantially zero value for the convolution weight of the second pixel if the backward kernel assigns substantially zero backward weight to the first pixel (paragraph [0017], line 11-18), (paragraph [0106], line 1-5), (the examiner interpreted that the use of Newton's method to find the zero of function is the same concept as the convolution weight using forward weight and backward weight to determine the zero of function)

(6) Regarding claim 6 and 25:

Kaufman et al. disclose the method and software product (figure 3, paragraph [0023], line 5-7), where the determining of the convolution weight of the second pixel includes specifying a substantially non-zero value for the convolution weight of the second pixel if the backward kernel assigns a substantially non-zero (paragraph [0017], line 11-18). (The examiner interpreted the image as the second pixel and the reference as the first pixel, and the determining of the convolution weight of the second pixel is based on the image that substantially match the reference, which means if the reference is assigns zero, the image will be zero, and if the reference is assigns non-zero, the image will be non-zero)

(7) Regarding claim 7 and 26:

Kaufman et al. disclose the method and software product (figure 3, paragraph [0023], line 5-7), where the non-zero value for the convolution weight of the second pixel is a predetermined value. (Paragraph [108], line 7), (the examiner interpreted that

the convolution weight is predetermined value based on the formula, where all the elements of the formula (x, y and f) are predetermined values)

(8) Regarding claim 11 and 30:

Kaufman et al. disclose the method and software product (figure 3, paragraph [0023], line 5-7), where the local attribute of the image at the second pixel is a luminance value (paragraph [0092], line 1-4), (the examiner interpreted the second pixel as the image and the first pixel as reference).

(9) Regarding claim 12 and 31:

Kaufman et al. disclose the method and software product (figure 3, paragraph [0023], line 5-7), where the received forward kernel is operable to blur the image at the first pixel (paragraph [0080], line 7-9)

(10) Regarding claim 13 and 32:

Kaufman et al. disclose the method and software product (figure 3, paragraph [0023], line 5-7), where the specified backward kernel is operable to blur the image at the second pixel (paragraph [0080], line 7-9), (the examiner interpreted that the blurring of the image at the first pixel is the same concept as the second pixel by using the filtering algorithm forward and backward kernel)

(11) Regarding claim 14 and 33:

Kaufman et al. disclose the method and software product (figure 3, paragraph [0023], line 5-7), where the received forward kernel is operable to sharpen the image at the first pixel (paragraph [0116], line 1-3)

(12) Regarding claim 18 and 37:

Kaufman et al. disclose the method and software product (figure 3, paragraph [0023], line 5-7), further comprising:

specifying one or more further background kernels, each of the further backward kernels being centered at a corresponding further pixel within the neighborhood surrounding the first pixel and assigning backward eights to pixels in a neighborhood surrounding the corresponding further pixel, each of the further pixel backward kernels being on a local attribute of the images at the corresponding further pixel (paragraph [0120], line 1-7), (the examiner interpreted the back projection reconstruction as the backward kernel, and the specifying of one backward kernel or plurality of backward kernel is interpreted as the same concept)

determining the convolution weight of each further pixel based on the corresponding backward kernel and the forward kernel (paragraph [0109], line 1-14), (the examiner interpreted the forward kernel as Fourier transform, and backward kernel as inverse Fourier transform)

using the convolution weight and a pixel value of each further pixel to generate the new value of the first pixel (paragraph [0108], line 7), (the examiner interpreted that the convolution kernel formula recited in paragraph [0108], line 7 can be used to generate a new value of the first pixel).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 9-10,15,19,28-29,34, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaufman et al. in view of Szeliski et al. (US 6,215,496)

(1) Regarding claim 9 and 28:

Kaufman et al. disclose all the subject matter as in claim 1 above.

However, Kaufman et al. does not disclose the method, where the local attribute of the image at the second pixel is a depth value corresponding to a distance of an object represented by the second pixel relative to a focal distance as recited in claim 9.

Szeliski et al. teaches a method and software product for rendering images or spirits that include depth components in their representation, where the local attribute of the image is a depth value (see the abstract), (column 5, line 52) corresponding to a distance of an object relative to a focal distance (column 6, line 30-31).

One of ordinary skill in the art would have clearly recognized the depth value (column 5, line 50-56) corresponding to a distance of an object relative to a focal distance (column 6, line 30-31). Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to combine the method of Szeliski et al. where the depth value representing a displacement of the pixel from a selected plane with the method of Kaufman et al. because in such feature by using the depth components in mapping the spirits renders images more efficiently and with greater realism (column 1, line 6-7), as well as generating more realistic rendering of a spirit when it's viewed from different angles (column 2, line 29-31).

(2) Regarding claim 10 and 29:

Kaufman et al. disclose all the subject matter as in claims 1 and 9 above.

However, Kaufman et al. does not disclose the method, where receiving user input specifying a depth map assigning the depth value to each pixel in the image as recited in claim 10.

Szeliski et al. teaches a method and software product for rendering images or spirits that include depth components in their representation, where the receiving user input specifying a depth map assigning the depth value to each pixel in the image (column 2, line 4-7)

One of ordinary skill in the art would have clearly recognized the assigning of the depth value to each pixel in the image by receiving user input specifying a depth map (column 5, line 60-64). Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to combine the method of Szeliski et al. where the depth value representing a displacement of the pixel from a selected plane with the method of Kaufman et al. because such feature renders images more efficiently and performs the 2 dimensional wrap (mapping) by using for example efficient backward or inverse mapping techniques, or texture mapping hardware can be used as well (column 6, line 31-34).

(3) Regarding claim 15 and 34:

Kaufman et al. disclose all the subject matter as in claim 1 above.

However, Kaufman et al. does not disclose the method, where receiving the forward kernel centered at the first pixel includes receiving an array of forward weight,

each forward weight in the array being assigned to a pixel in the neighborhood surrounding the first pixel as recited in claim 15.

Szeliski et al. teaches a method and software product for rendering images or spirits that include depth components in their representation, where each forward weight in the array being assigned to a pixel in the neighborhood surrounding the first pixel (column 10, line 58-60)

One of ordinary skill in the art would have clearly recognized the forward kernel, which includes receiving an array of forward weights (column 10, line 56-60). Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to combine the method of Szeliski et al. where the depth value representing a displacement of the pixel from a selected plane with the method of Kaufman et al. because such feature will typically correct gaps or holes that arise from the forward mapping whenever neighboring destination pixels do not differ by more than 1, which means that the maximum gap size is 1 (column 10, line 60-64).

(4) Regarding claim 19 and 38:

Kaufman et al. disclose all the subject matter as in claims 1, 15, and 16. (The examiner interpreted that the fact that the data comprises a plurality of filtered images means that image include plurality of pixels (see paragraph [0028]), and specifying a plurality of forward kernel is the same concept as one forward kernel)

However, Kaufman et al. does not disclose the method where the forward kernel and the convolution weight are determined based on the depth value as recited in claim 19.

Szeliski et al. teaches a method and software product for rendering images or spirits that include depth components in their representation, where the depth value is determined (column 5, line 52)

One of ordinary skill in the art would have clearly recognized that the forward kernel is related to the depth value (column 5, line 60-64). Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to combine the method of Szeliski et al. in the system of Kaufman et al. because in such feature by using the depth components in mapping the spirits renders images more efficiently and with greater realism (column 1, line 6-7), as well as generating more realistic rendering of a spirit when it's viewed from different angles (column 2, line 29-31).

7. Claims 16 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaufman et al. in view of Dowski et al. (USPGPUB 2003/0169944)

Kaufman et al. disclose all the subject matter as in claim 1 above

However, Kaufman et al. does not disclose the method, where receiving the forward kernel centered at the first pixel includes receiving a kernel function having a kernel location at the first pixel, and specifying the forward weight to each pixel in the neighborhood surrounding the first pixel based on the distance between the kernel location and the pixel in the neighborhood as recited in claims 16 and 35.

Dowski et al. teaches an optimized image processing for wevefront coded imaging system, where receiving a kernel function having a kernel location at the first pixel (paragraph [0062], line 21-23), and specifying the forward weight to each pixel in

the neighborhood surrounding the first pixel (paragraph [0016], line 6-7) based on a distance between the kernel location and the pixel in the neighborhood (paragraph [0140], line 6-9)

One of ordinary skill in the art would have clearly recognized the forward kernel centered at the first pixel include a kernel function having a kernel location at the first pixel (paragraph [0066], line 12-14), and specifying of forward weight to each pixel in the neighborhood surrounding the first pixel (paragraph [0084], line 3-7) based on the distance between the kernel location and the pixel in the neighborhood (paragraph [0140], line 6-9). Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to combine the method of Dowski et al. where the specifying of forward weight is based on the distance between the kernel location and the pixel in the neighborhood, because in such feature by jointly optimizing the optics and mechanics with the electronic parameters, high quality imaging systems are made that are inexpensive in terms of physical components, assembly, and image processing (paragraph [0006], line 6-9).

8. Claims 17 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaufman et al. in view of Dowski et al. as applied to claim 16, and further in view of Lee (US 2003/0197877)

Kaufman et al. and Dowski et al. disclose all the subject matter as in claims 1 and 16 above.

However, Kaufman et al. and Dowski et al. do not disclose that the kernel function depends on kernel radius as recited in claim 17.

Lee teaches a color separation method and software product and printed product of the method where the kernel function depends on a kernel radius (figure 29, paragraph [0088], line 1-5)

One of ordinary skill in the art would have clearly recognized the dependence of kernel function on a kernel radius (paragraph [0095], line 7-15). Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to combine the method of Lee where the kernel function depends on a kernel radius in the system of Kaufman et al. because such feature addresses ways for dealing with edges within a given object field by minimizing or eliminating misregistration artifacts in the printed images (paragraph [0007], line 6-9) as well as only fewer number of inks may be used to achieve a satisfactory color rendition, which may reduce the shadow and black density one might achieve on blacks using four colors (paragraph [0020], line 5-7, line 15-17).

Allowable Subject Matter

9. Claims 4,8,23 and 27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record Kaufman et al. and Szeliski et al does not teach or suggest the setting of the value of the convolution weight to the smaller of the forward weight and the backward weight.

The prior art of record Kaufman et al. does not teach or suggest that the non-zero value for the convolution weight of the second pixel is the forward weight assigned to the second pixel by the forward kernel.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Tsai et al. (US 6,640,017) disclose a method and apparatus for adaptively sharpening an image.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Amara Abdi whose telephone number is (571) 270-1670. The examiner can normally be reached on Monday through Friday 7:30 Am to 5:00 PM E.T..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on (571) 272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Amara Abdi
02/27/2007

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SUPERVISORY PATENT EXAMINER